How Dread Diphtheria Can Be Prevented and Cured Nowadays

Diphtheria resembles scarlet fever in that it is an acute contagious disease, to which children are particularly liable; but it is unlike scarlet fever in its various symptoms, and in the fact that one attack does not protect the patient from the recurrence of the disease. Furthermore, adults often contract diphtheria, nurses and doctors frequently taking it from their patients.

Diptheria is primarily a disease of the nose and throat, characterized by the formation of a whitish patch or "membrane" on the lining of the nose or throat. It appears in various forms. Where the membrane forms on the tonsils, the disease is simply called "Diptheria"; where the membrane forms in the nose, the disease is known as "nasal diptheria"; and where the membrane appears in the wind-pipe, the disease is "membranous croup." This last is the most dreaded form of diptheria, for the membrane cuts off the air from the lungs, subjects the patient to possible suffocation, in addition to the other dangers of the disease.

Cause of Diptheria.

Although diptheria is among the oldest known diseases, its true cause has only been ascertained during the last twenty-five years. As soon as scientists learned that small germs, or plants, caused disease, they began to search for such a cause in diptheria. Aided by the microscope, the Swiss scientist Klebs discovered a particular germ present in cases of diptheria. His results were verified by the German Loeffler, and from their names the bacillus of diptheria is known as the "Klebs-Loeffler" bacillus. When these germs get into the throat of a person susceptible to diptheria, they multiply very rapidly—so rapidly, in fact, that millions of them are grown in a few hours. The germs themselves are not generally circulated in the blood, but grow in masses in the throat. These masses of germs, with the tissue about them, make up the whitish patch called the "membrane." As they grow, these germs produce a poison, which poison is taken into the system and causes the general symptoms of the disease.

Symptoms of Diptheria.

The symptoms of diphtheria show themselves, in most cases, within three or four days after the patient has been exposed to the germs of the disease. The patient first complains of sore throat. This grows worse, and ere long fever appears. In other cases, sickness at the stomach and vomiting are the first symptoms of infection; and in membranous croup the first symptom may be a hoarse, harsh cough, or actual difficulty in breathing.

The dangerous character of diphtheria makes it very important that the above symptoms be closely watched. When diptheria is known to be in the neighborhood, even a slight sore throat should be carefully examined, for it may be diptheretic. Again, the croup symptoms must be especially watched. Ordinary croup does not give rise to difficult breathing for more than a few moments at a time; hence any prolonged attack of difficult breathing is always suspicious. It is safer to consult a physician promptly, as an hour's delay frequently increases the dangers from membranous croup. Mild cases are not less dangerous to the community than the more virulent, for a very severe outbreak of diphtheria frequently has its beginning in a few mild or unrecognized cases. Every precaution should, therefore, be taken to prevent its spread.

Diphtheria is Preventable.

For many years before its true cause was ascertained, Diphtheria was a disease with which the medical profession was powerless to cope. But with the knowledge of the true cause of the disease came the knowledge of the proper means of preventing it. As a consequence diphtheria is much more readily controlled, and its character is much milder than in former years. The prevention and control of diphtheria depend on five things, which will be expiained

1. Accurate diagnosis of all cases.
2. Prompt isolation of those attacked.
3. Prompt injection of antitoxin into the sick and exposed.
4. The maintenance of isolation until the germs disappear from the throat.
5. Disinfection during sickness and after recovery.

Diagnosis of Diphtheria.

Until the discovery of a germ as the cause of dipatheria, the diagnosis of the disease was largely a matter of guess-work. Severe cases were generally recognized sooner or later, but mild cases, equally dangerous to the community, were often not identified as true diphtheria. Modern laboratory methods have put an end to this and have enabled the physician to identify the various forms of the disease with comparative certainty. This laboratory diagnosis is at the disposal of every physician in Virginia, free of cost.

Method of Laboratory Diagnosis.

The shape of the bacillus of diphtheria is so peculiar as to render it readily recognizable where any large number of them are examined under the microscope. But as these germs are taken from the throat, they become mixed with other germs until it is often impossible to discern them. To overcome this difficulty, we must take advantage of the fact that the germs of diphtheria multiply and grow much more rapidly on certain substances than other germs do. Hence the germs taken from the throat are placed on one of these substances, called Loeffler's serum, and are kept in a warm place for twelve hours. At the end of that time, if diphtheria germs are present, they have grown to such an extent that they can be easily seen under the microscope. In practical operation the State Health Department distributes to the physicians of the State a number of diphtheria "swabs." These are bits of cotton, encased in glass tubes and so treated that all germs in the cotton have been killed. The physician takes one of these swabs, rubs it in the throat of a child suspected of Diphtheria, replaces the swab in the tube and mails it to Richmond. In the Department Laboratory the swab is opened and the germs contained in it are treated in the manner indicated above. In twelve hours the physician can be informed whether or not the swab contained diphtheria germs.

Isolation and Quarantine.

The germs of the disease are given off from the patient in the discharges from the throat and nose and in other ways. Anything about a diphtheria patient is apt to have the germs on it. The following precautions have been found by long experience in many places to be absolutely necessary to prevent the spread of the disease, and they should be carried out in every aces of diphtheria.

The patient must be strictly isolated in a separate room, as far away from the other members of the family as possible, and no one except the nurse and the doctor should visit the patient during the time he is isolated. The patient must not leave the room until the doctor has discharged him. This discharge should usually be not less than three weeks from the time the membrane disappears from the throat. Whenever possible the nurse should stay in the room with the patient the whole time of isolation, and should not leave it except when it is urgently necessary. She should keep away from the rest of the family, especially the children.

If proper isolation is kept up the following mild quarantine will be sufficient. No children from a house where there is diphtheria should play with other children, or attend school, Sunday-school or any public gathering. Adults from houses where there is diphtheria should not go to public gathering or work in places where there are children or young persons employed. No one from a house where this disease exists should visit where there are children or kiss or fondle in any way.

The sick-room should preferably be on the top floor of the house, and before the patient is put into it all unnecessary furniture and all drapery and hangings should be removed. It should be sunny, well ventilated and screened from flies. Outside the door there be placed a wash-tub filled with carbolic acid solution (one pound of black carbolic acid to five gallons of water). There should also be a large wash-boiler with a small amount of water in the bottom, and a jar for slops.

Everything that come from the sick-room should be thoroughly disinfected, in the manner indicated below, before being touched by any one else. Underclothing and bed clothing should be put by the nurse directly into the disinfectant solution and allowed to remain for one hour before taken out and rinsed for washing.

Dishes and glass and metal articles should be put into the washboiler by the nurse without allowing them or her hands to touch the outised of the boiler. The boiler should then be put on the stove, and the articles boiled for twenty minutes before being removed. Scraps of food, rags that have been used for receiving the discharges from the nose and throat, and other refuse should be put into a paper box or bag and burned.

Slops should be spored into the jar by the nurse and then covered with the carbolic solution and allowed to stand for one hour before being emptied.

Use of Antitoxin.

As has been already stated, the poison produced by the growing diphtheria germs in the throat or nose is absorbed in the blood and carried to every part of the body. Once this poison is in the blood, no amount of medicine applied to the throat or nose of the patient will have any effect on the poison. Only with the discovery of the antitoxin, of diphtheria has a way been found to overcome this poison from the germs. This discovery, which has been the means of saving many thousand lives, came about in the following way. Soon after the cause of diphtheria was ascertained, it was found that beef tea, in which diphtheria germs had been grown, contained a large amount of the poison from the germs. Every germ in the beef tea might be killed, and this poison would remain in the beef tea and would poison the animals into which it was injected. Soon there came the discovery that if a small amount of this poison in the beef tea were injected into an animal the animal would not die. By increasing the amount injected from time to time, it was found that the animal could be given without effect many times the dose which would have killed it if administered at first. Some of the blood of an animal thus treated was then mixed with fresh poison and was given another animal. The animal showed no signs of disease; the blood of the first animal contained an antitoxin—a substance which worked against the toxin, or poison, mixed with it. The next step was to apply this antitoxin to the poison already in the body of a person with diphtheria. It was soon found that the antitoxin would act on this poison in the same manner, and would enable the patient to recover.

The knowledge of this discovery spread over the civilized world in a few years, and has been of incalculable benefit in stamping out diphtheria. Antitoxin is now made in large quantities from the blood of horses. These animals are injected with the diphtheria poison in increasing doses until they are immune. Their blood is then drawn, the clot is removed leaving the so-called "serum," and this, in turn, will destroy the effects of virulent diphtheria poison. The serum is put up in small syringes, ready for use, and is placed upon the market.

Antitoxin Will Prevent Diphtheria.

Following the discovery that diphtheria may be cured by the injection of antitoxin, came one equally important,—that diphtheria could be prevented by injecting any person exposed to diptheria with a small dose of the antitoxin. This discovery meant much in preventing the spread of diphtheria. Prior to that time, when one member of a family contracted the disease, the others were very liable to develop it in a short time, and about one-half of those attacked would die. At the present time such a possibility is most remote. All those who have been exposed are injected with a small dose of antitoxin, which renders them immune to the disease for some months at least. They at least have nothing to fear from the first case.

Effects of Antitoxin.

In the early days of antitoxin, and while it was still in its experimental stages, many mistakes were made in its use, and there grew up some popular prejudice against it. It is still a common thing to hear people say that they would not allow antitoxin to be used on their children, because "it affects the heart." We now know that this is an error. Where the heart is affected, the poison of the diphtheria has done its dread work before the antitoxin is administered. The antitoxin does not affect the heart.

In fact, the ill-effects of antitoxin are, in a vast majority of cases, slight and temporary. The most common result of administering antitoxin to a patient is a mild skin eruption, or "hives," which lasts but a few hours. Sometimes slight fever and pain in the joints appear; but most frequently there are no ill effects. Deaths from antitoxin are extremely rare,—only a few having occurred in hundreds of thousands of cases where antitoxin has been used.

Without antitoxin, the mortality from diphtheria is one in two; with antitoxin, it is one in ten or twelve or fourteen. Any one who fails to administer antitoxin in cases of diphtheria is throwing away the patient's chance of recovery.

Should be Administered Early.

All who have used antitoxin in any number of cases agree as to its wonderful value in treating diphtheria, and are unanimous in holding that the earlier in the case the antitoxin is administered the less of it is needed and the surer and more rapid its action. The following facts are borne out by the experience of hundreds of practitioners:

Of the cases of diphtheria treated with antitoxin on the first day of the disease practically all recover.

Of the cases not given antitoxin until the second day, about five in the hundred die.

Of the cases not given antitoxin until the third day, about twenty-five in the hundred die.

Given promptly, antitoxin saves nearly every case.

Given late, antitoxin saves many but not all.

Maintenance of Quarantince Until the Germs Disappear from the Throat.

One of the things that makes the control of diphtheria difficult is the fact that the germs may stay in the throat of a patient long after the symptoms of the disease have disappeared and while the patient is feeling perfectly well. Usually within about two weeks after the membrane is gone from the throat the germs also disappear. In some cases, however, the germs seem to adapt themselves to living in the throat of the patient, without doing the patient any harm, but still capable of giving the disease to any healthy person into whose throat they may come.

In view of this fact, no patient should be released from quarantine for diphtheria until a swab has been made from the throat in the same way as for diagnosis and has been examined by a bacteriologist and found free from the germs of the disease.

In every epidemic of diphtheria there will be one or two patients in whose throats the germs will hang on, and who will become very restless at the long quarantine. The continuance of the quarantine is, of course, a hardship to the individual, but it is a necessity to the community. Such a case may, indeed, be more dangerous than an active case.

The state department of health will make the necessary examination for the disappearance of the diphtheria germs free of cost. Special "containers" for the shipment of swabs for examination are kept for distribution by the three medical members of the country boards of health in the State.—Virginia Health Bulletin.